INFO SHEET

Veterinary Services

United States Department of Agriculture
Animal and Plant Health Inspection Service
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Escherichia coli 0157 In United States Feedlots

Escherichia coli O157 that produce shiga-like toxin (STEC) are strains of a significant cause of foodborne illness in the U.S. Though this organism only results in an estimated 62,458 human cases per year (0.45 percent of all foodborne illnesses), it is estimated to cause 1,843 hospitalizations and 52 deaths each year[1].

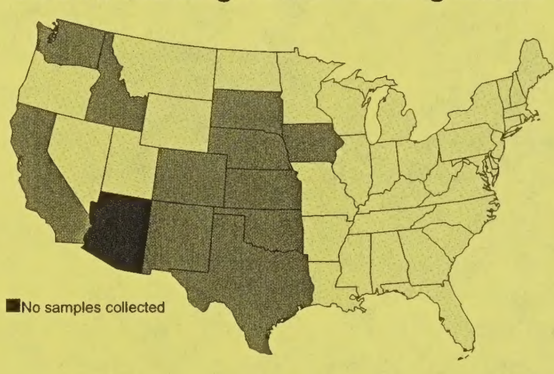
The beef industry has implemented many intervention strategies in harvest facilities to reduce the likelihood of carcass contamination with STEC and other potential foodborne pathogens.

In addition to these post-harvest strategies, interest continues in pre-harvest strategies for reducing the percentage of animals entering harvest facilities carrying potential pathogens or in reducing the pathogen loads in the gastrointestinal tracts of animals presented for harvest. To understand the potential for pre-harvest intervention, it is important to understand the distribution of these pathogens in the feedlot setting.

In 1999, the USDA's National Animal Health Monitoring System (NAHMS) conducted Feedlot '99, a study of feedlots with 1,000-head-or-more capacity within the 12 top cattle feeding states. These operations represented 84.9 percent of the U.S. feedlots in 1999 and contained 96.1 percent of the U.S. cattle inventory on feedlots with 1,000-head-or-more capacity on January 1, 2000.

Figure 1.

Twelve Leading Cattle Feeding States



As part of this study, 73 feedlots were recruited in 11 states (Figure 1) to collect fecal samples from pen floors throughout a one-year period (October 1999 through September 2000). In each feedlot, 25 fecal samples were collected from the floors of three pens. The pens were selected to represent cattle that had been on feed the shortest time, the longest time, and a randomly selected pen (75 total samples). Sampling occurred in each feedlot twice over the course of the year.

Overall, 11.0 percent (1,148/10,415) of fecal samples were culture positive for STEC. The largest percentage of samples positive for STEC came from pens where the cattle had been in the feedlot the shortest time (Table 1).

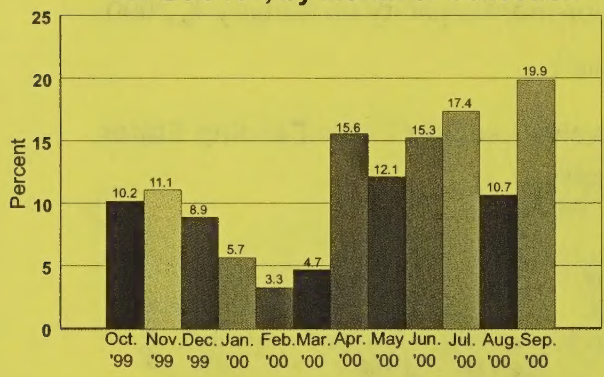
[1] Mead et. al., Food-related Illness and Death in the United States. Emerg. Inf. Dis. 5:607-625

Table 1. Percent of Samples Positive for STEC, by Pen Type

Pen Type	Samples Collected	Samples Positive	Percent of Samples Positive
Short-fed	3,515	487	13.9
Random	3,388	360	10.6
Long-fed	3,512	301	8.6
Total	10,415	1,148	11.0

The largest percentage of samples was positive (19.9 percent) in those collected in September (Figure 2).

Figure 2. **Percent of Samples Positive for ECO157, by Month of Collection**



Samples were collected from 422 cattle pens, with 58.8 percent (248/422) having one or more positive samples. Most (52.4 percent) of the positive pens had 1, 2, or 3 positive samples. There was no geographic trend in the percentage of pens with culture positive samples. The percentage of samples culture positive from the Northern, Middle and Southern regions[2] was 11.5, 8.4 and 13.0, respectively. All feedlots had one or more positive samples during the course of the study.

Data from NAHMS' 1994 Cattle On Feed Evaluation (COFE) reported 1.6 percent of samples positive for STEC. There are two important differences between the Feedlot '99 study and COFE that may explain these disparities:

1) A different, more sensitive, culture method was used in the Feedlot '99 study.

2) COFE was carried out from October through December, when the expected STEC prevalence is lower.

In conclusion, STEC appears to be widely distributed in cattle populations at feedlots. Future analyses of these data will focus on animal and nutritional factors associated with samples from pens that tested positive for STEC.

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[2] Northern Region: Idaho, Iowa, Nebraska, South Dakota, Washington
Middle Region: Colorado, Kansas, Oklahoma
Southern Region: California, New Mexico, Texas